the above named points for the application of blisters, to the exclusion of all others. He was often obliged to place them upon other portions of the nerve, and, by a happy coincidence, his theory led him to select those which are the most constant seats of pain, viz. the external malleolus, the instep, the head of the fibula, and the outer edge of the ham. We, who cannot admit a theory having no foundation in facts, may yet profit by the results of experience. We should be guided in our selection of the points for applying blisters, by the statements of the patient and by an accurate search for painful spots, according to the principles already laid down, and, in case an exceptional point should be discovered, ought to treat it like an ordinary one. The number of blisters to be applied at the same time must be settled by the practitioner, according to the intensity of the disease, and the number of the painful points. In severe cases I have applied three at a time, each of them about an inch in diameter."

We have attempted to make such an analysis of the treatise of M. Valleix as should present his own discoveries distinct from the historical and critical portions of the work. But in doing this, we have, in order to avoid prolonging this article unduly, been obliged to give very little more than an abstract of the author's own abstracts. Besides incidentally contributing to the settlement of a great many questions relative to the symptomatology of the disease, M. Valleix has established two very important propositions, viz. 1st, That neuralgia exists in the most superficial portions only of the spinal nervous system, where it can be detected by pressure upon the affected nerves; and 2d, That the most certain, and the speediest cure for it is flying blisters applied over the various painful points in the course of the nerves. It should be recollected that these are not opinions, that they are not hasty inferences from imperfectly registered or only remembered cases; but that they are logical inductions from cases minutely and honestly studied, and recorded when observed. They have a value entirely irrespective of the talents or the reputation of M. Valleix, although it required the patience and yet the earnestness of a lover of truth, to develop them from out of the vast mass of materials that had been collected.

We are not disposed to criticise a work which is so fruitful in good. We hope that some one may be found willing to undertake its translation into English, both for the sake of the valuable information it contains, and for its excellence as a model for future observers. We have yet much to learn about the functional diseases of the nervous system, and the plan of study pursued by our author may perhaps be found still farther applicable to them. A. S.

ART. XI.—*The Climate of the United States and its Endemic Influences. Based chiefly on the Records of the Medical Department and Adjutant General's Office, United States Army.*—By SAMUEL FORRY, M.D. New York, 1842: 8vo. pp. 378.

THE merit of being the first to establish, on an extensive scale, the recording and collecting of meteorological observations, with the view of improving our knowledge of the climate of the United States, is we believe due to the late Surgeon General of the United States Army, Dr. Lovell, who about twenty years ago issued instructions to the surgeons at the different posts to keep regular records of the weather, and transmit them to the de-

partment at Washington; and in 1826 he published the results of these observations for the preceding four years.

The first state that adopted measures to obtain meteorological obser vations from its various sections, was New York, where the academies and other schools established under legislative patronage have been bound, for many years past, to keep meteorological registers, and make reports of the results to the Regents. The legislature of Pennsylvania, in 1836, made a liberal appropriation for similar purposes, by means of which each county in the state, fifty-four in number, is supplied with a set of meteorological instruments, with which observations have been made and reported monthly to a special committee of the Franklin Institute at Philadelphia, where they can be consulted at all times by persons engaged in meteorological investigations. Ohio has within the last year come into a similar measure, so that we have now a very extensive district of country embraced within the borders of New York, Pennsylvania and Ohio, covered, as it were, with points of instrumental meteorological observation. When to these efforts of individual states we add those of the Medical Bureau of our army, embracing observations not only at posts within the older settlements, but also at those in the most remote parts of our territories; and also those made under the direction of the British authorities in their extensive possessions, it may be said that in future little want can be experienced of meteorological data, by which the progress of storms, and all the great atmospheric movements can be traced through the North American Continent. To those engaged in solving the intricacies of meteorological phenomena, the importance of such means of information need not be dwelt upon.

It is therefore with particular pleasure that we hail the treatise before us, a pleasure which we are sure will be reciprocated at large by our medical brethren, who cannot fail to appreciate the value of such a collection of authentic matter in relation to the climatology of our country, from the oldest settlements on the Atlantic coasts, to the farthest out-posts of civilized occupation, even to the shores of the Pacific. The volume is very appropriately dedicated to Dr. Lawson, Surgeon General of the United States Army, under whose direction the investigation of the subject was first undertaken by the author in the "Army Meteorological Register," and the "Statistical Report of the sickness and mortality of the army of the United States," both of which publications we have already had occasion to notice favourably in this Journal.

The authentic materials employed in the composition of the volume before us have required years to collect, and years to collate and digest.—All this labour has been accomplished through the design and execution, by members of the medical profession. Dr. Forry's work may therefore be regarded as a new contribution to science by that faculty which furnishes by far the largest proportion of labourers in the field of philosophical research.

Dr. Forry divides his work into two general divisions or parts. The *first* division is devoted to the elucidation of the laws of climate in general, and especially to the climatology of the United States. The *second* division treats of the endemic influences peculiar to the systems of climate developed in the first part.

In accordance with the motto derived from Malte Brun, that "the best observations upon climate often lose half their value for the want of an

exact description of the surface of the country," our author gives a bold outline of the physical features of the United States and territories, stretching from the Atlantic to the Pacific Oceans, and from the Gulf of Mexico to the Northern inland seas.

1. The Atlantic Plain, is viewed as slightly elevated above the sea, gradually widening from a few miles in the North, to upwards of 150 miles in the South. This alluvial zone, sloping gently to the ocean, has in many places extensive marshes, swamps, sluggish streams, and innumerable inlets from the sea. The deposits swept by the mighty rivers into the tide-water region, afford but too many sources of noxious effluvia, or miasmata.

2. The Apalachian range of mountains terminating this plain, has a mean altitude above the sea of about 2500 feet, with crests rising occasionally to the height of 3000 feet. Its spurs separate from each other so as to form extensive valleys of great beauty and fertility, having an average elevation of 1000 or 1200 feet above the ocean. The western declivity of this Apalachian or Alleghany range, descends into the great Mississippi plain or basin, extends through the centre of the continent from the Gulf of Mexico to the Arctic Sea, and stretches westward to the Rocky Mountains or Great Chippewayen range. This vast valley is computed to contain not less than 3,250,000 square miles, and is undoubtedly the largest continuous body of lands of the highest natural fertility to be found on the globe. It already counts its millions of inhabitants, and is destined in the order of nature to rival, even perhaps excel, in population the teeming plains of India and China. The grand mountain chain into which the Mississippi valley rises on the west, called by the various appellations of Rocky, Chippewayen, and Oregon, is a prolongation of the Andes, or Mexican Cordilleras. Rising from a common base of about 3000 feet above the level of the sea, the average height of the summits above the base is set down at 5000 feet, some of the crests being not less than 8,000 or 10,000 feet above the adjacent country.

Beyond this bold chain and still farther west, we find the range of the Pacific coast, properly called, stretching northward from the peninsula of California. They are from 80 to 100 miles distant from the ocean, and have peaks rising even above the most elevated of the Rocky Mountains, some, we are informed being 10,000, 15,000, and even 18,000 feet above the level of the sea. The summits of these as well as those of the Rocky range, must necessarily be above the line of perpetual congelation. Thus is the territory of the United States geographically divided by two great systems of mountains into three natural subdivisions, namely, the Atlantic table-land and plain, the Mississippi valley, and the Pacific region.

To this view of the geographical systems into which the United States and territories are naturally divided by mountain ranges of sufficient elevation to produce modifications of climate, a description of the general character of the surface at the present day, may be appropriately added, in the words of our author.

"From the shores of the Atlantic to the Mississippi, there is presented an immense natural forest, interspersed with open and naked plains, called *prairies*, which are numerous west of the Alleghanies, but very rare on the Atlantic side. The country west of the Mississippi is comparatively lightly wooded; and in the arid and desert plains, occupying a breadth of 300 or 400 miles, only a few trees are seen along the margins of the rivers. In that portion of the United

States which is inhabited, the land cleared and cultivated does not probably exceed one-tenth part of its surface."

Various portions of the United States and territories present characteristics sufficiently marked to justify a division and classification of climates. But previous to considering the local circumstances which exert modifying influences, we think it proper to invite attention to what we regard as the great principle of climatology.

If the phenomena of terrestrial and atmospheric temperature which constitute the most prominent elements of climate, depended solely upon the position of the earth in relation to the sun, then would there be such a uniformity in the climates of countries in similar latitudes as to render it easy to classify them according to their respective distances from the equator or proximity to the poles. But observations made in different parts of the world show that in similar latitudes climates differ greatly, as is exemplified on the two sides of the northern Atlantic, where the mean temperatures of places on or near the ocean are found to differ in some cases 10 degrees of Fahrenheit, the climate of the European coast being that much warmer than the American in the same latitude. When, instead of mean temperatures, extremes of heat and cold are compared, the difference is still more striking.

Now, in explaining the rationale of this well known fact, we are compelled to refer to a grand natural phenomenon, which we shall designate the great Atmospheric circulation. This commences in the tropical region where the accumulated heat of the sun rarefies the air, which, ascending into the higher regions of the atmosphere, flows off towards the North and South. To compensate for the loss by this successive flowing off of the heated and rarefied portion, and maintain that equilibrium which the barometer informs us always subsists in the atmosphere throughout the globe, lower currents of heavier air sweep into the tropical regions from the northward and southward. These last have been denominated the polar currents, whilst the uppermost are designated as the tropical currents; and these, it is well known, do not flow directly north or south, but slantwise, a fact which is ascribed to the influence exerted by the motion of the globe upon its axis, and the different velocities existing at different parts of its surface. Owing therefore to the combined agencies of solar heat, and diurnal rotation, the lower winds in the equatorial region have a slanting direction from the eastward constituting the Trade Winds, which blow the year round between the tropics, except where changed into Monsoons by the interposition of some influences by which a change is wrought in their direction during six months of the year. Whilst the winds within the tropics thus blow interminably from the eastward, those without the tropical limits have a prevailing direction from the west. Here then we find the solution of the problem, that in extra-tropical latitudes all countries situated to the eastward of seas or other great bodies of water, have milder climates than those occupying the eastern portions of continents. Large bodies of water never become so cold in winter or so warm in summer as the earth. Hence whenever the predominant winds sweep from the sea, they carry with them the temperature of the water to a greater or less distance inland, and thus obviate extremes. When, however, the prevailing winds pass over large tracts of country, they must necessarily bear with them the greater or less degrees of cold induced by congelation, and

still more through radiation, whilst in summer they will convey the accumulated heat absorbed by the earth. This view enables us to understand why the proximity of the Gulf Stream,—that mighty lake of warm water, as Major Reynell calls it, not inferior in size to the Mediterranean,—does not shed upon the shores of the United States a larger portion of its high temperature, the greatest proportion of the warmth communicated by it to the atmosphere being actually wafted to the distant shores of Europe.

The celebrated Humboldt, who has devoted so much attention to the investigation of climate, and especially to the laws and agencies concerned in the distribution of heat over the surface of the globe, has formed a system of lines of equal temperature encircling the globe, and passing through places having the same mean temperature, either throughout the year or during particular seasons. Those passing through places having similar annual means are called *isothermal lines.* As, however, it is frequently found that where the annual temperatures agree there is a great difference in the means of particular seasons, other lines have been drawn to show this, such as pass through places having equal summer temperatures being called *isotheral,* and those representing equal winter means *isocheimal* lines.

These lines, which from their generally crooked forms are also called *curves,* demonstrate to the eye in a striking manner the well known fact, that the distribution of temperature on both sides of the equator is by no means in exact conformity to latitude or distance from the equinoctial line. Let us, for example, take Humboldt's isothermal line drawn through different points around the globe, having a mean annual temperature of 55°.40 Fahr., and we shall find it in the eastern part of North America passing near Philadelphia, in lat. 39°.56; in the eastern part of Asia, near Pekin, in the same latitude with Philadelphia; whilst on the western side of Europe it runs near Bourdeaux, in lat. 45°.46; and on the western coast of N. America, it is found at Cape Foulweather, a little south of the mouth of the Columbia river, latitude 44°.40. Between the western part of Europe and the eastern portion of N. America, the following differences in mean temperature are found in similar latitudes, the increase in latitude being attended by a very great increase in the difference of the means:

Latitude.	*Mean Temp. of E. coast of N. Am.*	*Mean Temp. Western coast of Europe.*	*Differences in mean temp.*
30°	66°.92	70°.52	3°.60
40°	54°.50	63°.14	8°.64
50°	37°.94	50°.90	12°.96
60°	23°.72	40°.60	16°.92

Now all the great variations in the lines of equal temperature are mainly dependent upon the operation of those extensive natural movements which we have styled the great atmospheric circulation. "The causes of climate," our author remarks, "constitute together a circle of which we can designate neither the first nor the last concatenation." For ourselves, we find no difficulty in determining what may be considered the beginning link of the chain connecting nearly all the grand phenomena of climatology, which is doubtless the atmospheric rarefaction induced in the equatorial region through solar influence.

After this consideration of the great general agent in the production of climate, we will proceed to notice a few of those circumstances which are well known to exert more or less important effects upon the distribution of heat. One of the principal of these, is elevation above the level of the sea. Meteorologists compute that the temperature of the atmosphere falls off or grows colder in ascending above tide-water, at the rate of 1° Fahr. for every 100 yards, or 300 feet. In cool countries it would require, even in summer, but a slight ascent to reach the elevation where a temperature at and above 32°, fixes the line of perpetual congelation. But in warm regions, such as those within or bordering upon the tropics, the line of perpetual snow is elevated some 14,000 or 16,000 feet above the level of the ocean.

Whenever land rises high above the common sea-level, it induces a change of climate similar in its effects upon the distribution of temperature, and the consequent distribution of plants, to increase of latitude. The phenomena thus induced upon the products of the vegetable world are strikingly exhibited in the stupendous mountains which in central America tower above the common level of the ocean.

In reference to the diminution of temperature resulting from the elevation of land, our author makes the following interesting observations.

"Whilst the flowers of spring are unfolding their petals on the plains of northern France, winter continues his icy reign upon the Alps and Pyrenees. By this beneficent appointment of nature, the torrid zone presents many habitable climates. On the great table-plain of Mexico and Guatimala, a tropical is converted into a temperate clime. As the vernal valley of Quito lies in the same latitude as the destructive coasts of French Guiana, so the interior of Africa may possess many localities gifted with the same advantages. In our own country, reference has already been made to the marked contrast between the Atlantic plain and the parallel mountain ridges; but it is in the geographical features of Columbia, in South America, that we find most strikingly displayed the physical phenomenon of *height* producing the effect of *latitude*—a change of climate with all the consequent revolutions of animal and vegetable life, induced by local position. It is on the mountain slopes of from 3,000 to 7,000 feet, beyond the influence of the noxious miasmata, that man dwells in perpetual summer amid the richest vegetable productions of nature. In the mountains of Jamaica, at the height of 4,200 feet, the vegetation of the tropics gives place to that of temperate regions; and here, while thousands are cut off annually along the coast by yellow fever, a complete exemption exists. In these elevated regions, the inhabitants exhibit the ruddy glow of health which tinges the countenance in northern climes, forming a striking contrast to the pallid and sickly aspect of those that dwell below. In ascending a lofty mountain of the torrid zone, the greatest variety in vegetation is displayed. At its foot, under the burning sun, ananas and plantains flourish; the region of limes and oranges succeeds; then follow fields of maize and luxuriant wheat; and still higher, the series of plants known in the temperate zone. The mountains of temperate regions exhibit perhaps less variety, but the change is equally striking. In the ascent of the Alps, having once passed the vine-clad belt, we traverse in succession those of oaks, sweet chesnuts, and beeches, till we gain the region of the more hardy pines and stunted birches. Beyond the elevation of 6,000 feet, no tree appears. Immense tracts are then covered with herbaceous vegetation, the variety in which ultimately dwindles down to mosses and lichens, which struggle up to the barrier of eternal snow. In the United States proper, we have at least two summits, the rocky pinnacles of which shoot up to the altitude perhaps of 6,500 feet. Of these, Mount Washington, in New Hampshire, is one. Encircling the base is a heavy forest—then succeeds a belt of stunted firs —next a growth of low bushes—and still further up only moss or lichens, or

lastly, a naked surface, the summits of which are covered, during ten months of the year, with snow. Of the snow-capt peaks of Oregon, we possess no precise knowledge."

It has, however, been ascertained that the decline of temperature on rising above the common level of the sea, and which is commonly reckoned at 1° for every 300 feet of elevation, is less where large tracts of country rise gradually than when the estimate is made either by balloon ascension, or scaling the sides of isolated and precipitous mountains. A striking illustration of this is offered by the ridges and valleys of the great Himmaleh mountains of Southern Asia, where immense tracts, which theory would consign to the dreariness of perpetual congelation, are found richly clothed in vegetation and abounding in vegetable and animal life. At the village of Zonching, 14,700 feet above the level of the sea, in lat. 31°.36 N. Mr. Colebrook found flocks of sheep browsing on verdant hills; and at the village of Pui, at about the same elevation, there are produced, according to Captain Gerard, the most luxuriant crops of barley, wheat, and turnips, whilst a little lower the ground is covered with vineyards, groves of apricots, and many aromatic plants.

The effects of gradual elevation in lessening the falling off of temperature, is manifested upon a moderate scale in our own country. The mean temperature of Eastport, Me., for example, is 42°.95, whilst that of Fort Snelling in the same latitude, but far in the interior, with an elevation of some 600 or 800 feet above the sea, is 2°.88 higher, namely, 45°.83, instead of being two or three degrees colder, to correspond with the law of elevation.

In regard to the extremes of heat and cold in the United States, it would be natural to expect the greatest heat would be registered at the most southerly, and the severest cold at the most northern posts. But the exact instrumental observations now furnished, prove this not to be the case, especially in the vicinity of the sea, where it would seem the proximity of water tends to moderate the heat of summer in the south, and the cold of winter in the north. It is in some of the western regions, remote from the ocean and inland seas, those for example, in which Forts Snelling, Gibson, and Council Bluffs, are situated, that the mercury rises highest and sinks the lowest. On the 15th of August 1834, at Fort Gibson, two thermometers observed by Dr. Wright of the army, rose in the shade, carefully excluded from reflected or radiated heat, the one to 116°, and the other to 117° Fahrenheit.

It is a law applicable to all parts of the world, wherever no inland lakes or seas exist, to interpose a modifying influence,—that on leaving the coast and going into the interior, the difference between the mean temperature of summer and winter increases, the climates being more subject to extremes of heat and cold. To show that no exception to this law is furnished in the United States, we may adduce the instance of Fort Sullivan, Eastport, Me., on the ocean in lat. 44°.44, where the winter mean temperature is 17°45 Fahrenheit above that of Fort Snelling in Iowa, the latitude being the same. The climate of Fort Snelling, our author informs us, is the most excessive among all the military posts in the United States, resembling that of Moscow in Russia, as regards the extremes of the seasons, notwithstanding the latter is 11° further north. But at Moscow the mean temperature both of winter and summer is lower,—that of winter being as 10°.78 to 15°.95, and that of summer as 97.°10 to

72°75. That the influence of the lakes in modifying the climate in their vicinities is not less than that of the ocean, is demonstrated by a comparison of the summer and winter means of posts situated near them in about the same latitude. The difference between the mean temperature of summer and winter at Fort Preble, on the Atlantic, is 41°.03, and of Fort Niagara on Lake Ontario, 41°.73. At the *excessive* post, Fort Crawford, Wiskonsin, a few minutes further south than the two places first mentioned, the difference amounts to 50°.89. Again, a comparison of the difference between the winter and summer means of some other posts situated in the same latitude shows the following results, by which the increase in extremes on going west is strikingly demonstrated. The difference between the mean temperature of summer and winter at Fort Wolcott, Newport, Rhode Island, is 36°.55; at West Point, N. Y. 40°.75; Fort Armstrong, Illinois, 49°.05; and at Council Bluffs, near the junction of the rivers Platte and Missouri, 51°.35. The highest, lowest, and annual range of the thermometer at three of the posts just mentioned is as follows:—

	Highest	Lowest	Annual Range.
Fort Wolcott, Newport, R. I.	85°	2°	83°
Fort Armstrong, Illinois,	96°	10°	106°
Council Bluffs,	104°	16°	120°

Although the mean temperatures of winter on the sea-coast, is 6° higher, and of summer, 8°.71 lower than in places situated on the same parallel in the interior beyond the influence of the lakes, the means of spring are 4.°13, and of autumn 0°.40, higher in the interior situations. This is the result of a comparison made in the latitude of about 43°.

How strongly are all these views of the eastern climate of the United States contrasted with the equable temperature found in the Pacific region. At Fort Vancouver, for example, situated on the Columbia river, about 75 miles above its mouth, the difference between the winter and summer means is only 23°.67, although a degree farther north than Fort Snelling, five degrees more northerly than New York, and nearly on the same parallel with Montreal. During a year passed at Fort Vancouver, the lowest fall of the thermometer was to 17°. On nine days only was the temperature below the freezing point in the month of January, so that ploughing is carried on whilst the vegetables of the preceding season are still standing in the gardens untouched by frost. And why does not New York, situated directly on the Atlantic ocean, derive as much warmth from this magazine of heat, as Fort Vancouver does from the more distant Pacific? Simply because the predominant westerly winds sweep upon one place the chilling blasts of extensive districts of land, cooled to congelation, or covered with snow, whilst over the other they waft the genial warmth of the sea. For similar reasons the ameliorations of climate experienced in the vicinity of the interior lakes, must always be felt most to the eastward.

The classification of climates distinguished by Dr. Forry in the United States and territories, is founded upon a general division into Northern, Middle and Southern regions; the first being characterized by the predominance of a low mean temperature, the Southern by a high temperature, and the Middle vibrating to both extremes. Each of these general divisions is subdivided into classes or systems sufficiently marked.

The *Northern System* has three classes, the *first* embracing the coast of New England, extending as far south as the harbour of New York; the *second* including the districts in the proximity of the Northern lakes; the *third*, portions of country alike remote from the ocean and inland seas.

The *Middle division* has two classes, the *first* embracing the Atlantic coast from Delaware Bay to Savannah; the *second*, interior stations.

The *Southern division* has also two classes, the *first* including those parts in which the military posts on the Lower Mississippi are situated, and the *second* the peninsula of East Florida.

It is the Northern region which presents at the same time the greatest diversity of physical character and the most strongly marked variations in climate. East of the great lakes the several mountain ranges seldom exceed the height of 2500 feet above the level of the sea—the table-lands upon which the ridges rest rising perhaps, on an average, to half the height named. We have already adverted to the fact, that on the coast of New England, the influence of the ocean is manifested in moderating extremes of temperature. Advancing into the interior the extreme range of the thermometer increases, and the seasons are violently contrasted, until getting within the influence of the lakes, when a climate like that of the seaboard is found. That the lakes have this capacity to modify the climate in their vicinity will be evident to any one who considers that they occupy not less than 94,000 square miles, having a depth varying from 20 to 500 feet. Beyond the modifying agency of these inland seas, temperatures still more excessive are exhibited, a comparative view of which, including exact estimates for the sea-coast and regions of and beyond the great lakes, has been already given.

When the climates on the sea-coast and interior country remote from the lakes are compared in relation to the proportions of *fair* and *cloudy* weather, *rain* and *snow*, the following results appear. During the year, the proportion of *fair* days on the sea-coast compared to those of the interior, are as 202 to 240—*cloudy* days 108 to 77;—*rainy* days 45 to 31; *snowy* 9 to 16.

Comparing the climate of the lakes with that of the same region beyond their influence, the contrast is yet more striking, the prevailing weather of the former being cloudy, and the latter fair; thus, during the year, the proportion of days is,

	Fair.	Cloudy.	Rain.	Snow.
Lakes,	117	139	63	45
Remote from Lakes,	216	73	46	29

The relative proportion of rainy and cloudy days during the year is, therefore, in the former locality 247, and in the latter 148, giving the far west about 100 more sun-shiny days out of the annual sum of 365.

Thus much for the Northern division.

In considering the climate of the middle division of the United States, our author thinks himself justified by the results of the meteorological observations in his possession, in distinguishing two classes, designated as *uniform* and *excessive* climes, the first being slightly under the influence of the Atlantic Ocean, whilst the southwestern stations show the powerful influence of the Gulf of Mexico.

In proceeding south, the seasons, as a general rule, appear more uniform, the annual mean temperature increasing as a matter of course. Some of the eastern posts in this middle division present such great contrasts between their summer and winter temperatures, as almost to place them in the list of excessive climes. The modifying influence of the adjacent ocean and bays are however still apparent, since farther westward on the same parallels, greater extremes are common.

"The region of Pennsylvania, as though it were the battle ground on which Boreas and Auster struggle for mastery, experiences, indeed, the extremes of heat and cold. But proceeding south along the Atlantic Plain, climate soon underdoes a striking modification, of which the Potomac river forms the line of demarcation. Here the domain of snow terminates. Beyond this point, the sledge is no more seen in the farmer's barnyard. The table-lands of Kentucky and Tennessee, on the other hand, carry, several degrees farther south, a mild and temperate clime. Although very few thermometrical observations have been made upon the table-land lying in the centre of the middle division or upon the ridges which crest this long plateau, thus rendering it impracticable to determine fully the interesting question of their influence upon temperature; yet we are enabled to supply this deficiency, in some measure, by observations made upon the differences in vegetable geography. Thus in Virginia, as the limits of the state extend quite across the Apalachian chains, four natural divisions are presented, viz., 1. The Atlantic Plain or tide-water region, below the falls of the rivers; 2. The Middle region, between the falls and the Blue Ridge; 3. The Great Valley, between the Blue Ridge and the Alleghany Mountains; and 4. The Trans-Alleghany region, west of that chain. In each of these, the phenomena of vegetation are modified in accordance with the climatic features. On the Atlantic Plain, tobacco is the principal staple; in the Great Valley, it is cultivated only in the southern portion; and beyond the Alleghany, its culture is unknown. In the first only is cotton cultivated, and in its southern part quite extensively. In North Carolina, the Atlantic Plain extends 60 or 70 miles from the coast, whilst the Middle region, corresponding to that described in Virginia, gradually merges into the mountainous regions farther west. As these table-lands are elevated from 1,000 to 1,200 feet above the sea, upon which rise many high crests, one of which (Black Mountain) is the highest summit of the Alleghany system, the diversity of climate on the same parallels causes a corresponding difference in the vegetable productions. Whilst the low-lands yield cotton, rice, and indigo, the western high country produces wheat, hemp, tobacco, and Indian corn. In South Carolina, three strongly marked regions are also presented; but as the temperature increases, as a general law, in proportion as we approach the equator, cotton is cultivated throughout the state generally. Georgia, Alabama, and Mississippi, like the Carolinas, are divided into three well defined belts, exhibiting similar diversities in vegetable geography. Cotton and rice, more especially the former, are the great agricultural staples; and on the Atlantic Plain of these three states, as well as its continuation into Florida and Louisiana, (which last two will be more particularly adverted to in the southern division,) sugar may be advantageously cultivated. In North Carolina and Virginia, the Atlantic Plain forms, as it were, a chaos of land and water, consisting of vast swamps, traversed by sluggish streams, expanding frequently into broad basins with argillaceous bottoms. Throughout its whole extent, as already remarked, it is characterized by similar features, besides being furrowed with deep ravines in which the streams wind their devious way. The hot and sultry atmosphere of these low-lands, in which malarial diseases in every form are dominant, contrasts strongly with the mild and salubrious climate of the mountain regions—results that will be developed more fully in the investigation of endemic influences.

"It may not be amiss, as illustrative of the comparative temperature of the Atlantic Plain and the adjacent mountain region, to present here a few thermome-

trical data, however limited in extent, noted, during the summers of 1839 and 1840 at Flat Rock, Buncombe county, North Carolina.

Places of Observation.	Lat.	Mean Temperature.			
		July.	Aug.	Sept.	Oct.
Fort Monroe, Coast of Virginia,	37°.00	80°	70°	72°	64°
Flat Rock, Buncombe, N. C.,	35°.30	69°	70°	62°	61°
Charleston, South Carolina,	32°.45	81°	81°	77°	71°

"Flat Rock is about 250 miles from the Atlantic, and is elevated perhaps 2,500 feet above the level of the ocean, whilst the latitude given is also a mere approximation derived from general knowledge. The observations made at Charleston embrace the same years as those at Flat Rock, but the data at Fort Monroe comprise the years 1828, 29, and 30. It is thus seen that the difference of temperature at Flat Rock and the other two points, taking an average of the latter, is in July 11°, August 10°, September 13°, and October 6°. As regards the monthly range of the thermometer, little difference is presented."

Although the general inquirer may find most interest in considering the phenomena connected with climatology in the two first general divisions of the United States, the medical inquirer will attach the most importance to the characteristics of the southern region, as this presents the most formidable array of diseases, and at the same time holds out a refuge to valetudinarians who could not long resist the combined pressure of disease and a rigorous northern winter clime.

Along the Atlantic coast of the United States, the mean temperature of the year diminishes in a very unequal ratio. Between Charleston and Philadelphia, the difference of means is $10\frac{1}{2}°$ Fahr., or in the proportion of about $1\frac{1}{3}°$ of temperature to 1° of latitude. Between Philadelphia and Eastport, Maine, the difference in means is much greater, namely, 12°.33 Fahr. being in the increased proportion of nearly 2°.5 of mean temperature per degree of latitude. Again, between Charleston, S. C., and New York harbour, the difference of means is 12°.78, or 1°.59 per degree of latitude. Between New York harbour and Eastport, Maine, the difference is 11°, or about $2\frac{3}{4}°$ Fahr. per degree of latitude. The average proportion between Charleston, S. C., and Eastport, Maine, is equal to about 2° of temperature for each degree of latitude.

In approaching south, the extremes of winter and summer grow less, and the seasons glide more imperceptibly into each other. At Fort Snelling, situated in the excessive climate of the west, in latitude 44°.53, the difference between the summer and winter means is, as has been before stated, no less than 56°.60; at Eastport, Maine, 39°.15, at West Point, N. Y., 40°.75, at Charleston, S. C., 30°.34, at St. Augustine, Florida, 20°, whilst at Key West, it is only 11°.34.

"There is," says Dr. Forry, "little difference between the thermometrical phenomena presented at Key West and the Havana. In the West India islands, the mean annual temperature near the sea is only about 80°. At Barbadoes, the mean temperature of the seasons is—winter, 76°, spring 79°, summer 81°, and autumn 80°. The temperature is remarkably uniform; for the mean annual range of the thermometer, even in the most excessive of the islands, is only 13°, and in some it is not more than 4°.* Contrast this with Hancock Barracks, Maine, which gives an average annual range of 118°, Fort Snelling, Iowa, 119°, and Fort Howard, Wiskonsin, 123°!

"The peculiar character of the climate of East Florida, as distinguished from

* According to the British Army Statistics.

that of our more northern latitudes, consists less in the mean annual temperature than in the manner of its distribution among the seasons. At Fort Snelling, for example, the mean temperature of winter is 15°.95, and of summer 72°.75, whilst at Fort Brooke, Tampa Bay, the former is 64°.76, and the latter 84°.25, and at Key West, 70°.05, and 81°.39. Thus though the winter at Fort Smelling is 54°.10 colder than at Key West, yet the mean temperature of summer at the latter is only 8°.64 higher. In like manner, although the mean annual temperature of Petite Coquille, Louisiana, is nearly 2° lower, that of Augusta Arsenal, Georgia, nearly 8°, and that of Fort Gibson, Arkansas, upwards of 10° lower than that of Fort Brooke; yet at all, the mean summer temperature is higher. Between Fort Snelling on the one hand, and Fort Brooke and Key West on the other, the relative distribution of temperature stands thus: Difference between the mean temperature of summer and winter at the former 56°.60, and at the two latter 16°.49 and 11°.34; difference between the mean temperature of the warmest and coldest month, 61°.86 compared with 18°.66 and 14°.66; difference between the mean temperature of winter and spring, 30°.83 to 8°.35 and 5°.99; and the mean difference of successive months, 10°.29 to 3°.09 and 2°.44."

A comparison in regard to equality and mildness of climate drawn between the seasons of Florida and those of the most favoured places on the European continent, those of Italy and southern France, results generally in favour of the Florida Peninsula. At Key West the annual range of the thermometer is but 37°. The advantages East Florida presents to invalids as a winter residence, are therefore very obvious.

The question has been much debated, whether the temperature of the crust of the earth or of the incumbent atmosphere has undergone any perceptible changes since the earliest records, either from the efforts of man in clearing away forests, draining marshes, cultivating the ground, or other causes. La Place has demonstrated very satisfactorily, that since the days of Hipparcus, an astronomer of the Alexandrian school, who flourished about 2000 years ago, the earth cannot have become a single degree of heat warmer or colder, as otherwise the sidereal day must have become either lengthened or shortened, which is not the case.

As to the question of changes in atmospheric temperature affecting the seasons, M. Arago thinks that sufficient proofs exist to justify the conclusion that in Europe, at least, a sensible elevation of the annual mean temperature has resulted from the conquests of agriculture. The thermometer is comparatively a modern instrument, invented by Galileo in 1590, but still left so imperfect, that it was not till 1700 that Fahrenheit succeeded in improving and rendering it a correct and perfect instrument. It is evident that the want of exact instrumental observations prior to the commencement of agricultural improvements must render it extremely difficult to determine with any precision, what changes may have been effected through these in the mean temperatures of the year or particular seasons. Hence, notwithstanding the expression of his belief in the changes of atmospheric temperature, M. Arago looks to America for the necessary data by which the point must be definitely settled.

"Ancient France," he remarks, "contrasted with what France now is, presented an incomparably greater extent of forests; mountains almost entirely covered with wood, lakes and ponds, and morasses, without number; rivers without any artificial embankment to prevent their overflow, and immense districts, which the hands of the husbandman had never touched. Accordingly, the clearing away of the vast forests, and the opening of extensive glades in

those that remain; the nearly complete removal of all stagnant waters, and the cultivation of extensive plains, which thus are made to resemble the *stepes* of Asia and America—these are among the principal modifications to which the fair face of France has been subjected, in an interval of some hundreds of years. But there is another country which is undergoing these same modifications at the present day. They are there progressing under the observation of an enlightened population; they are advancing with astonishing rapidity; and they ought, in some degree, suddenly to produce the meteorological alterations which many ages have scarcely rendered apparent in our old continent. This country is North America. Let us see, then, how clearing the country affects the climate there. The results may evidently be applied to the ancient condition of our own countries, and we shall find that we may thus dispense with *à priori* considerations, which, in a subject so complicated, would probably have misled us."

There is great force in the following remarks of Dr. Forry, and the facts adduced in their support:

"Dense forests and all growing vegetables doubtless tend considerably to diminish the temperature of summer, by affording evaporation from the surface of their leaves, and preventing the calorific rays from reaching the ground. It is a fact equally well known that snow lies longer in forests than on plains, because, in the former locality, it is less exposed to the action of the sun; and hence, the winters, in former years, may have been longer and more uniform. As the clearing away of the forest, causes the waters to evaporate and the soil to become dry, some increase in the mean summer temperature, diametrically contrary to the opinion of Jefferson and others, necessarily follows. It is remarked by Umfreville that, at Hudson's Bay, the ground in open places thaws to the depth of four feet, and in the woods to the depth only of two. Moreover, it has been determined by thermometrical experiments that the temperature of the forest, at the depth of twelve inches below the surface of the earth, is, compared with an adjacent open field, at least 10° lower, during the summer months; whilst no difference is observable during the season of winter.

"It may, therefore, be assumed, that although cultivation of the soil may not be productive of a sensible change in the mean annual temperature, yet such a modification in the distribution of heat among the seasons may be induced as will greatly influence vegetation."

Bearing upon this point, Dr. Forry furnishes a table exhibiting a comparative view of the atmospheric temperature at Philadelphia, at intervals of about a quarter of a century, (from 1771 to 1824,) which shows a successive decrease in the mean of winter, and an increase in the means of spring, summer, autumn, and whole year.* Some allowance must be made in these estimates for the effects of increase in the size of the city, and the additional shelter in winter, and opportunity of accumulating heat in summer thus afforded. All towns are observed to grow warmer as they extend their limits. When, therefore, we find a decline in the mean temperature of winter, notwithstanding the extension of the city limits, we must infer that it can arise from no other cause than a general diminution in the winter temperature throughout the country.

Any changes in the climate of the United States as yet perceived, are very far from justifying the sanguine calculations indulged in a few years

* The 6th volume of Transactions of the American Philosophical Society, new series, contains an abstract of meteorological tables, showing the temperature at Philadelphia for 80 years from 1758 to 1838, giving the mean of each month, the annual mean; and the greatest and least degrees of heat; the last part of the series, embracing the period from 1829 to 1838, by Dr. Thomas T. Hewson.

ago by a writer on the climate and vegetation of the fortieth degree of North latitude,* who, in concluding his essay, says:

"But there will doubtless be an amelioration in this particular," (severity of cold) "when Canada and the United States shall become thickly peopled and generally cultivated. In this latitude, then, like the same parallels in Europe at present, *snow and ice will become rare phenomena, and the orange, the olive, and other vegetables of the same class, now strangers to the soil, will become objects of the labour and solicitude of the agriculturist.*"

Had this writer extended his inquiries a little further, he might have found that the region of Oregon, lying west of the Rocky Mountains, though as yet in a primitive state of nature, has a climate even milder than that of highly cultivated Europe in similar latitudes. And again, China, situated precisely under the same conditions as the United States in regard to the sea, though long since subjected to the highest state of agricultural improvement, possesses a winter climate as rigorous, and some assert even more so, than that of the United States in similar latitudes.

There are many points considered by our author which it would have given us pleasure to have noticed more particularly. We have endeavoured to follow him through the main course of his investigation, and when it is considered that the facts and views he presents are original, and the results of years of observation and severe mental toil, upon subjects essentially connected with medical inquiries, we hope we shall not be considered as having gone out of the track of our professional readers, or trespassed too much upon their valuable time.

G. E.

ART. XII.—*A System of Midwifery, with numerous wood cuts.* By EDWARD RIGBY, M. D., &c., with Notes and additional illustrations. Philadelphia, Lea & Blanchard, 1841: 8vo. pp. 491.

We know of no series of treatises, devoted to a consideration of the different branches of medical science, the character of which has been so uniformly sustained as that which composes the several volumes of Tweedie's Library of Medicine. If the successive portions of the work do not actually exceed in value those which preceded, they, at least, in no instance sink below them;—while the whole, so far as published, presents a very able, and generally speaking, full and accurate exposition of the actual condition of the healing art, as well in relation to its principles as to its practical details.

The volume before us, which embraces the obstetrical department of the Library, will command a high rank among the numerous systems of midwifery that have appeared within the few past years, bearing the names of some of the most distinguished cultivators of the obstetric art.

While the author has made free use of the labours of his predecessors and contemporaries, he has not confined himself to the humble task of a

* Remarks on the Climate and Vegetation of the fortieth degree of North latitude. By Richard Sexton, M. D., published in the 5th volume of this Journal; a paper containing many highly interesting observations upon the Climatology of the United States.